SYNTAX

Using data to make irresistible bread: How King's Hawaiian is transforming production with Syntax and SAP Digital Manufacturing

Whitepaper

SAP Platinum Partner

Introduction

King's Hawaiian, a renowned brand celebrated for its delectable and authentic Hawaiian bakery products, has a rich heritage dating back to its founding in the 1950s in Hilo, Hawaii. The company has perfected the art of crafting irresistible bread and rolls, capturing the essence of the Hawaiian spirit. Today, King's Hawaiian products are a staple on tables across the nation.

To continue this tradition of excellence, King's Hawaiian has partnered with Syntax in project Nalu. In this project, King's Hawaiian selected SAP Digital Manufacturing as their Manufacturing Execution System (MES). This strategic initiative is aimed at transforming their production processes, enhancing operational efficiency, and reinforcing their commitment to quality.

Problem statement

Kings Hawaiian's goal is to produce perfect bread consistently at every plant. However, several challenges have hindered this consistency. Issues with oven temperature stability and air humidity significantly impacted both the dough and equipment, resulting in some packages of rolls being darker on top and others not rising properly. These inconsistencies led to material being scrapped.

Additionally, there were several areas with limited visibility and no effective methods for measuring scrap, rework, or integrating the cameras installed at the end of the line for quality control. Factors such as throughput, yield, and Overall Equipment Effectiveness (OEE) contributed to the overall challenges, but there were insufficient metrics to identify and correct the problems effectively.

Lastly, securing an adequate workforce posed complications due to regional factors, the global COVID-19 pandemic, and other challenges.

Overview

Project Nalu is the manufacturing component of King's Hawaiian's digital transformation journey. Starting with a new plant, King's Hawaiian has moved away from custom, on-premises systems to template based, configured solution using the cloud-based MES provided by SAP Digital Manufacturing (DM). SAP DM not only enables production execution, data collection and manufacturing metrics to be gathered, but also allows operators to focus on value added work by automating most of the data collection, downtime and confirmation activities. The use of IoT via AI and MI will also be deployed and interfaced into the MES and ERP as an indicator and solution for quality, temperature, yield, and other challenging areas. This will eventually allow the machines to recognize and autocorrect out of scope specifications for various products.

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Solution and partner selection

Why SAP DM

King's Hawaiian chose SAP DM and Syntax for several compelling reasons:

- **Comprehensive functionality:** Known for its comprehensive functionality, SAP DM enables agility, improves efficiency, and supports sustainable operations through a material-based Manufacturing Execution System (MES).

- **Future-proofing:** DM represents SAP's next-generation MES, aligned with Industry 4.0 standards.

- **Quality and efficiency vision:** DM supports King's Hawaiian's vision for enhanced quality and efficiency.

- **Advanced technologies:** DM enables AI, ML, and predictive analytics, along with inbuilt data collection and analytics.

- **Automation:** Facilitates automation of manufacturing operations, integrated plant maintenance, and inventory management.

Why Syntax?

- **DM Expertise:** With over 30 DM implementations worldwide, Syntax's Digital Factory team. Syntax brings a deep understanding of best practice MES implementations, ensuring a seamless transition and optimal results.

- **Shop floor knowledge:** Syntax's experience comes from people who worked in industry, with deep understanding of the challenges so manufacturing in the industry 4.0 world.

As a **SAP Platinum Solution Partner**, Syntax provides not only experience in DM, but with range of SAP products. Syntax provided the wholistic approach.

Before: Challenges and opportunities

Before embarking on this digital transformation journey, King's Hawaiian faced several challenges and identified numerous opportunities for improvement:

Disparate MES

King's Hawaiian had a variety of on-premise MES solutions. The largest being SAP Manufacturing Intelligence Integration (MII). Although SAP MII is a highly flexible solution, it had the following challenges:

- It requires development and maintenance of a custom use case specific database structure, queries and stored procedures
- User interfaces are 100% custom developed and maintained by the customer requiring JavaScript / UI5 development
- On premise hosting requires customer maintenance of Netweaver / MII / DB / OS and hardware
- End of support for MII is slated for 2027
- Does not lend itself to a governed and templated solution

Increased autonomy and automation integration

The operator's job should be as value added as possible. In this spirt, King's Hawaiian wanted their operators to have as little interaction with the MES as possible.

Data-driven decisions

King's Hawaiian wanted to leverage data-driven decisions to ensure consistent quality output of bread products. This would need to be accomplished by collecting large amounts of data from disparate sources including PLC and IoT sensors. Many factors, direct and indirect can affect the quality of the bread. King's Hawaiian wanted visibility into their processes and enviroment like never before.

Recipe security

King's Hawaiian closely guards its intellectual property with respect to its recipes (Secure Formula). Only authorized people should have access recipe components.

Local survivability

King's Hawaiian requires 24/7 availability.

Solution highlights

Global template

After detailed blueprinting, the DM solution was designed to leverage a global template. The template was implanted at the first greenfield plant. Subsequent plants are being rolled out using this template. The result is that minimal adaptions are required from line to line or plant to plant. The primary changes revolve around specific automation needs for each line. The solution is product agnostic, regardless of equipment used or not used on a specific line, the same logic can be applied. This allows to deploy globally but configure globally.

Reusable logic

Syntax developed flexible, reusable logic for order execution, data collection, and downtime. This not only reduces complexity, but lowers the number of API calls to DM, increasing efficiency while keeping network demands at a minimum.

Connection validation

To assure that the connection between DM and automation is alive, a periodic "heartbeat" signal between automation and DM is sent. DM must respond to the signal from automation within a specified time, otherwise the connection between DM and automation is considered down, and automation will begin buffering data. In addition, all execution steps, data collections and downtimes include validation logic between DM and automation.

Order release

When an order is released to production from S/4 HANA, the order information is simultaneously sent to both automation and to DM. If it is a dough order, the BOM components are not sent to DM as this is part of the formula security. Enough order information is sent to cover up to 48 hours of production as part of the local survivability.

Autonomous order execution

Automation triggers the start and completion of each phase of an order. Certain steps of the process require unique identification. In DM, this is tracked as a Shop Floor Control (SFC) number. These numbers can either come externally from automation or can be generated by DM. Automation drives all order execution until the order is complete. Confirmations are also performed in DM automatically, triggered from automation. As part of formula security, these values can be omitted or sent a relative value. The only interaction required from the operator is to enter scrap, and manual quality checks.

This provided the true "lights out" capability that King's Hawaiian desired. Operators can focus on their value-added duties.

Data collection

King's Hawaiian is collecting over 400 data points per line for both traceability and continuous improvement. For example, they are using plant humidity readings to feedback data into the line to make adjustments to the process in real time to assure bread consistency. This data will also be leveraged into future machine learning and AI models to do predictive analysis and predictive process suggestions.

Data visualization

The solution leverages Digital Manufacturing Insights for data visualization, allowing users to build standard and customized data visualization reports. The data visualization is further being extended using SAP Datasphere and SAP Analytics Cloud (SAC). This allows King's Hawaiian to visualize analyze and act on data from DM, S/4 and other disparate data sources such as external IoT sensors that are not being leveraged

Local survivability

In design cooperation between Syntax and King's Hawaiian, the line has the ability to execute orders for up to 48 in the unlikely event of a DM disconnect. This functionality was created prior to SAPs release of their edge solution for Digital Manufacturing.

Formula security

Security of King's Hawaiian's recipes are of the highest priority. Syntax and King's Hawaiian developed a solution using automation and DM to assure that their proprietary data is protected from unauthorized access both internal and external.

Business benefits realized

The implementation of SAP DM has provided King's Hawaiian with numerous business benefits:

Automation and flexibility	A highly flexible, reliable, and scalable manufacturing platform allows for quick introduction of new lines and plants.
Global standardization	Standardization across all plants and lines through a global template.
Operational visibility	Enhanced visibility of manufacturing operations from resource level to plant level.
Productivity	Reduced downtime and increased productivity through efficient technologies and automation, approaching a "lights out" facility.

Quality control	Consistent, high-quality products achieved through streamlined and efficient quality control processes.
Data security and traceability	Improved data security and high traceability.
Machine Learning	Data collection for machine learning to digitize tribal knowledge.
Accurate costing	More accurate throughput rates and actual cost calculations for products and overheads.

Conclusion

The partnership between King's Hawaiian and Syntax, leveraging SAP DM, and IoT has transformed King's Hawaiian's production capabilities. By addressing key challenges and capitalizing on opportunities for improvement, King's Hawaiian is transforming its manufacturing processes, achieving unprecedented levels of efficiency, quality, and innovation.

This strategic initiative not only reinforces King's Hawaiian's commitment to crafting irresistible bread but also positions the company for continued success in the future.

Contact us today

For more information about how Syntax and SAP DM can transform your manufacturing operations.

syntax.com/DM

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SYNTAX

Why Syntax

Syntax provides comprehensive technology solutions and trusted professional, advisory, and application management services to power businesses' mission-critical applications in the cloud.

With over 50 years of experience and 800+ customers around the world, Syntax has deep expertise in implementing and managing multi-ERP deployments in secure private, public, hybrid, or multi-cloud environments. Syntax partners with SAP, Oracle EBS, JD Edwards, AWS, Microsoft, and other global technology leaders to ensure customers' applications are seamless, secure, and at the forefront of enterprise technology innovation.

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